

Attorney Docket No.: 2004P01265US

Application No: 10/759,230

Page 2 of 8

IN THE CLAIMS:

1. (Currently amended) A method of assembling an exhaust gas recirculation valve, comprising the steps of

providing a base having a fluid conduit extending between first and second ports, a valve member disposed within the fluid conduit, and a valve shaft having a first end fixed to the valve member and a second end defining a longitudinal axis, and a spring extending between first and second cups, the first cup transferring inwardly toward the longitudinal axis a biasing force to the valve shaft, the second cup transferring inwardly toward the longitudinal axis a reaction force of the spring to the base, and the second cup being oriented in a direction opposite the first cup; and

mounting a linear actuator with rotary motor to the base, the actuator including a displaceable member having an end that is decoupled from the valve shaft and wherein the member's end is engaged with the valve shaft when the valve is configured in an open position.

2. (Original) The method of claim 1, wherein the mounting step includes disposing the member's end and valve shaft in a spaced relationship.

Claims 3 and 4 (Canceled).

5. (Currently amended) The method of claim ~~[[4]]~~ 1, further including the step of providing a passageway within the base and receiving the valve shaft within the passageway, the passageway having a first opening facing the actuator and a second opening facing the valve member, locating a bearing within the passageway, positioning a second flange the second cup at the first opening, ~~and engaging the first end of the spring with the second flange.~~

6. (Original) The method of claim 5, wherein the mounting step includes the step of positioning an end of the displaceable member in proximity of the second end of the valve shaft so that the member's end is brought in contact with the shaft second end.

7. (Original) The method of claim 6, wherein the providing step further includes forming a curved surface at the shaft second end.

8. (Original) The method of claim 7, further including the step of disposing a disc-shaped member at the end of the displaceable member.

9. (Currently amended) A method for operating an EGR valve, comprising the steps of:

providing a valve portion including a valve member engaged with a valve seat when the valve portion is in a closed position, a valve stem having a longitudinal axis, a first end secured to the valve member and a second end, and a spring that biases the valve member into engagement with the valve seat, the spring extending between first and second cups, the first cup transferring inwardly toward the longitudinal axis a biasing force to the valve stem, the second cup transferring inwardly toward the longitudinal axis a reaction force of the spring to the base, and the second cup being oriented in a direction opposite the first cup;

providing a linear actuator including a rotary motor and a displaceable member coupled to the motor's rotor, wherein the rotation axis of the rotor is substantially parallel to the longitudinal axis; and

opening the valve including pushing the displaceable member into the valve stem second end.

10. (Original) The method of claim 9, wherein the rotation axis is approximately parallel to the longitudinal axis.

11. (Original) The method of claim 9, wherein the pushing step includes pushing a disc-shaped member disposed at the end of the displaceable member into a curved shaped surface formed at the valve stem second end.

12. (Original) The method of claim 9, wherein the spring is a linear spring.

13. (Original) The method of claim 12, further including the step of disposing the spring between the valve member and the actuator.

Claim 14 (Canceled).

15. (Currently amended) A method of closing an EGR valve, comprising the steps of:
- providing a linear actuator having a rotary motor;
 - providing a base, a valve member disposed within the base and being engaged with a valve seat when the valve is closed and the valve member being linearly displaced from the valve seat when configured from an closed to open position, a valve stem coupled to the valve member and having a longitudinal axis, and the rotor axis of rotation is substantially parallel to a longitudinal axis;
 - providing a spring disposed below the actuator wherein the spring is compressed when the valve is open, the spring extending between first and second cups, the first cup transferring inwardly toward the longitudinal axis a biasing force to the valve stem, the second cup transferring inwardly toward the longitudinal axis a reaction force of the spring to the base, and the second cup being oriented in a direction opposite the first cup; and
 - upon power loss to the motor, closing the valve including expanding the compressed spring.

16. (Original) The method of claim 15, wherein the providing a linear actuator step includes providing a motor having a constant rotor rate.

17. (Original) The method of claim 16, wherein the motor is a synchronous motor.

Claim 18 (Canceled).

19. (Original) The method of claim 18, wherein the spring is a linear spring.

20. (Original) The method of claim 19, further including the step of disposing the spring between the valve member and the actuator.

Claim 21 (Canceled).

22. (Currently amended) A method of operating an EGR valve, including the steps of:

providing a linear actuator including a rotary motor having a rotor and shaft that is linearly displaced as the rotor rotates;

opening the valve, including the steps of extending the shaft, displacing a valve member from a valve seat, the valve member being coupled to a valve stem and having a longitudinal axis, and compressing a linear spring, the spring extending between first and second cups, the first cup transferring inwardly toward the longitudinal axis a biasing force to the valve stem, and the second cup being oriented in a direction opposite the first cup; and

upon power loss to the motor, closing the valve including retracting the shaft using the energy stored in the compressed linear spring.

23. (Original) The method of claim 22, wherein the providing a linear actuator step includes providing a synchronous motor.

24. (Original) The method of claim 23, further including the step of disposing the spring between the valve member and the actuator.

Claim 25 and 26 (Canceled).

27. (New) The method according to claim 1, further including providing a gasket between the base and the second cup, wherein the second cup is spaced from the gasket.

28. (New) The method according to claim 9, further including providing a gasket between the base and the second cup, wherein the second cup is spaced from the gasket.

29. (New) The method according to claim 15, further including providing a gasket between the base and the second cup, wherein the second cup is spaced from the gasket.